REMARKS

In the foregoing amendments, claims 1, 2, 16-21, 25, and 26 are amended; and claims 27 and 28 are added. Claims 1-28 are now pending in the present application.

I. Response to 35 U.S.C. §112, Second Paragraph Rejection

The Office Action rejected claims 2, 4, 8, 11, 14, and 19-21 under 35 U.S.C. §112, second paragraph as being indefinite. In particular, the Office Action objected to the use of "prior art cooling tunnel" in claims 2 and 19-21. In response thereto, the claims have been amended to replace "prior art cooling tunnel" with "cooling tunnel operated with cooling air in the region of the bottom (or lower) cooling unit." This feature is supported in the present specification and can be found, for instance, in the first paragraph on p. 3 of the specification. In light of these amendments, Applicant believes that all 35 U.S.C. §112 rejections have been overcome and respectfully requests that the rejections be withdrawn.

II. Response to 35 U.S.C. §102 Rejection

Claims 1, 2, 7, 8, and 16-21 stand rejected under 35 U.S.C. §102(b) as being anticipated by *Sakai* (U.S. Patent No. 4,881,379). Independent claims 1 and 16, as amended, include features that are not disclosed in *Sakai*. Therefore, Applicant respectfully traverses this rejection on the grounds that *Sakai* does not teach or disclose each and every element of the independent claims. Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. *See e.g., In re Paulsen,* 30 F.3d 1475, 31 USPQ 2d 1671 (Fed. Cir. 1994); *In re Spada,* 911 F.2d 705, 15 USPQ 2d 1655 (Fed. Cir. 1990).

A. Claim 1

Claim 1 recites a cooling tunnel comprising, *inter alia*, ***"a roller path arranged below the insulating plate to transport the lower portion of the conveyor belt."*** First of all, *Sakai* does not explicitly disclose an insulating plate as defined in the present application. Also, the Office Action does not appear to define what element in *Sakai* is considered to be an insulating plate. Therefore, we must assume that the Examiner interprets the bottom wall of *Sakai*'s freezing container 1 as an insulating plate. Based on this assumption, it should be noted that *Sakai* fails to

further provide a lower portion of the conveyor belt being transported below the insulating plate, as claimed. Instead, *Sakai* discloses that the lower portion of the conveyor belt is transported into the lower compartment 13 of the freezing container 1, which essentially is above the bottom wall of the freezing container 1. For at least the reason that *Sakai* fails to disclose this feature, Applicant respectfully requests that the Examiner kindly withdraw the rejection.

B. Claim 16

Independent claim 16 recites an apparatus for cooling articles of candy comprising, *inter alia*, ***"a roller path arranged below the insulating plate to transport the lower portion of the conveyor belt."*** Again, *Sakai* does not teach or disclose such a feature. Instead, the conveyor belt of *Sakai* is transported back through the lower compartment 13 of the freezing container 1, above the bottom wall of the freezing container 1. Therefore, for at least the reason that Sakai fails to disclose this claim limitation, Applicant believes that claim 16 is also allowable over *Sakai* and earnestly requests that the rejection be withdrawn.

C. Claims 2, 7, 8, and 17-21

Dependent claims 2, 7, 8, and 17-21 are believed to be allowable for at least the reason that these claims depend from allowable independent claims 1 and 16.

III. Response to 35 U.S.C. §103 Rejection

Claims 3-6, 9, and 22-24 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over *Sakai* in view of *Mills* (U.S. Patent No. 2,783,618). Claims 10, 11, 13, 14, 25, and 26 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over *Sakai* in view of *Protze et al.* (DE 40 40 429 A1). Claims 12 and 15 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over *Sakai* in view of *Mills* and further in view of *Protze et al.*

Applicant respectfully traverses these rejections for at least the reason that the combination of references, taken alone or in combination, do not disclose every feature of the independent claims from which these claims depend. Furthermore, the prior art does not provide any suggestion or motivation to modify *Sakai* in such a way as to read on the present claims. Even if such a suggestion were made, it would be

clear, as mentioned below, that there would be no reasonable expectation of success of such a modification.

As set forth in MPEP 706.02(j), three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

A. Claim 1

Claim 1 recites a cooling tunnel comprising, *inter alia*, ***"a roller path arranged below the insulating plate to transport the lower portion of the conveyor belt."*** The combination of references, taken alone or in combination, do not disclose a roller path arranged below an insulating plate. In addition, the prior art does not suggest modifying *Sakai* to include such a feature. However, assuming, for the sake of argument, that such a suggestion were made in the prior art, the advantages taught by *Sakai* of maintaining the conveyor belt at a low temperature by keeping it inside the freezing container 1 would be destroyed by such a modification. Therefore, even if such a modification were suggested, this modification would not produce a reasonable expectation of success since the *Sakai* freezing container would be unable to keep the conveyor belt at the desired low temperature.

B. Claim 16

Claim 16 recites an apparatus for cooling articles of candy comprising, *inter alia*, ***"a roller path arranged below the insulating plate to transport the lower portion of the conveyor belt."*** Again, the combination of prior art references fails to teach or disclose transporting the conveyor belt below an insulating plate. Furthermore, the references do not suggest modifying *Sakai* to include such a feature. It should be noted that *Sakai* is directed to a device that not just cools food, but freezes

the food. Since *Sakai* actually teaches the desirability of maintaining the conveyor belt at a very low temperature, modifying *Sakai* in such a way as to redirect the conveyor belt outside the freezing container would actually thwart the efforts to maintain the temperature of the conveyor belt necessary for freezing the food. Instead of helping *Sakai*, such a modification, if it existed, would actually negatively impact the device of *Sakai*. Therefore, not only is there no motivation taught in the prior art to make such a modification, but also there would be no reasonable expectation of success for such a modification in *Sakai*.

It has been established that "[t]here must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." *In re Oetiker*, 977 F.2d 1443, 1447, 24 USPQ 2d 1443 (Fed. Cir. 1992). If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

A §103 rejection based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, is not proper and the *prima facie* case of obviousness cannot be properly made. In short, there would be no technological motivation for engaging in the modification or change. To the contrary, there would be a disincentive. If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900,221 USPQ 1125 (Fed. Cir. 1984).

C. Claims 2-15 and 17-26

Dependent claims 2-15 and 17-26 are believed to be allowable for at least the reason that these claims depend from allowable independent claims 1 and 16.

IV. New Claims

Claims 27 and 28 have been newly added to further define and/or clarify the scope of the invention. Independent claim 27 includes the limitations of claim 1 as originally filed and additionally recites that ***"the cooling plate of the bottom cooling unit includes a flat upper sheet and a lower sheet, the lower sheet having a plurality***

of grooves through which the cooling liquid flows." Applicant asserts that the prior art fails to teach or suggest this claimed feature. For at least this reason, Applicant respectfully contends that claims 27 and 28 are allowable over the prior art of record.

V. Prior Art Made of Record

The prior art made of record has been considered, but is not believed to affect the patentability of the presently pending claims.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 1-28 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned at (770) 933-9500.

Respectfully submitted,

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Evelyn Sanders
Signature -

Attachment(s): Clean Copy of Substitute Specification
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New Abstract

*** * * * * MARKED-UP COPY OF SUBSTITUTE SPECIFICATION * * * * ***

COOLING TUNNEL FOR ARTICLES OF CANDY

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of co-pending *German patent application No. 100 04 754.8* entitled "Kühltunnel für Süßwarenstücke", filed on February 3, 2000.

FIELD OF THE INVENTION

The present invention generally relates to a cooling tunnel for articles of candy. The articles of candy may be articles including a core being covered by a mass, for example by a precrystallized chocolate mass. More particularly, the present invention relates to a cooling tunnel including an upper cooling unit and a bottom cooling unit. Cooling air is used in the region of the upper cooling unit. Heat is transferred from the articles of candy by radiation and/or by convection. Usually, a cooling liquid is used in the region of the bottom cooling. The cooling liquid is guided through a cooling plate. A mixture of water and glycol or another cooling fluid may be used as cooling liquid.

BACKGROUND OF THE INVENTION

A cooling tunnel is known from *German Patent No. 196 07 055*. The known cooling tunnel for articles of candy includes a driven conveyor belt on which the articles of candy are supported to be transported through the cooling tunnel in the moving direction of the conveyor belt. The known cooling tunnel includes a number of sections corresponding to its length. The

known cooling tunnel includes a treating region for articles of candy. The treating region is formed by an ~~insolating~~ insulating plate and by a cover or a hood. An upper cooling unit is located above the conveyor belt, and it includes a channel through which cooling air flows. The upper cooling unit at least includes three cooling zones being located one after the other in the moving direction of the conveyor belt. The cooling zone being located in the middle region of the cooling tunnel is designed as an absorption zone. The cooling zone being located at the end portion of the cooling tunnel is designed as a convection cooling zone. A bottom cooling unit is located below the conveyor belt. The bottom cooling unit for the articles of candy includes a cooling plate through which a cooling liquid flows.

In known cooling tunnels of this kind, the cooling plate is directly located on the ~~insolating~~ insulating plate in a way that they substantially contact each other. Usually, the ~~insolating~~ insulating plate is made of polyurethane or of a different plastic material. The cooling plate includes two sheets being interconnected by welding. The surfaces of the two sheets are also interconnected in a spaced apart manner. The cooling liquid flows through the interior of the cooling plate. It is to be understood that the known cooling tunnel also has a sectional design with respect to the cooling plate. Since the insulating plates are wider than the cooling plates, there are slots in each section and at both sides of the ~~insolating~~ insulating plates and of the cooling plates (as seen in cross section perpendicular to the direction of movement of the conveyor belt). The slots are located over the length of the cooling tunnel. Impurities and humidity may enter small gaps between the insulating plate and the cooling plate through the lateral slots. Consequently, there is the danger of germs occurring in the cooling tunnel. It is not possible to effectively seal the slots and to prevent impurities from entering the region between the adjacent plates. It is rather difficult to clean the slots because they are hard to be accessed.

Due to the fact that cooling tunnels are often cleaned with water, there is the danger of the cleaning water entering the small gaps between the cooling plate and the ~~insolating~~ insulating plate.

Another cooling tunnel is known from *German Patent No. 23 22 918*. The known cooling tunnel also includes a plurality of sections being located one after the other in the moving direction of the conveyor belt. The conveyor belt is moved and guided through the cooling tunnel. Articles of candy may be put on the conveyor belt to be cooled during the movement of the conveyor belt through the cooling tunnel. The known cooling tunnel includes an upper cooling unit, meaning a cooling unit being effective in the region above the plane of the conveyor belt and with which the articles of candy are being cooled ~~form~~ from above. Additionally, the known cooling tunnel includes a bottom cooling unit being located below the plane being defined by the conveyor belt. The bottom cooling unit is effective below the plane of the conveyor belt to cool the lower sides of the articles of candy through the conveyor belt. The known cooling tunnel includes an upper cooling unit using cooling air and a bottom cooling unit also using cooling air.

SUMMARY OF THE INVENTION

Briefly described, the present invention relates to a cooling tunnel for cooling articles of candy. More particularly, the present invention relates to a cooling tunnel including a driven conveyor belt being designed and arranged to support articles of candy and to convey them through the cooling tunnel in a moving direction. A treating region for articles of candy is surrounded by an ~~insolating~~ insulating plate and by a cover. An upper cooling unit is arranged in a region above the conveyor belt. The upper cooling unit includes a channel being

designed and arranged for cooling air to flow therethrough. A bottom cooling unit is arranged in a region below the conveyor belt. The bottom cooling unit includes a cooling plate being designed and arranged for cooling liquid to flow therethrough. The cooling plate in the treating region is designed and arranged to be spaced apart from the ~~insolating~~ insulating plate in a vertical direction. A free space is formed between the cooling plate and the ~~insolating~~ insulating plate.

The present invention also relates to an apparatus for cooling articles of candy. The apparatus includes a driven conveyor belt being designed and arranged to convey articles of candy through the apparatus in a moving direction. A cover and an ~~insolating~~ insulating plate are designed and arranged to form a region of treatment for articles of candy. An upper cooling unit is substantially arranged in a region above the conveyor belt. The upper cooling unit includes a channel for cooling air. A lower cooling unit is substantially arranged in a region below the conveyor belt. The lower cooling unit includes a cooling plate for a cooling fluid. The cooling plate is designed and arranged to be substantially spaced apart from the ~~insolating~~ insulating plate in a vertical direction to form a free space or a channel.

With the novel cooling tunnel, the danger of germs being generated between the cooling plate and the ~~insolating~~ insulating plate is substantially reduced. In the novel cooling tunnel, there are no slots between the cooling plate and the ~~insolating~~ insulating plate. Due to the vertical distance in combination with the parallel arrangement of the cooling plate and of the ~~insolating~~ insulating plate, there is a free space that may be easily accessed after removing or pivoting away the corresponding cover. The free space is not only located in the region of the edge portions of the cooling tunnel, but also in the direction of the width of the cooling tunnel. Such a free space may be easily and thoroughly cleaned when necessary. Additionally, the free

space may also be used as channel to fulfil additional functions. With the novel cooling tunnel, it is not necessary to seal the region between the cooling plate and the ~~insolating~~ insulating plate.

With the novel cooling tunnel, the following advantage is achieved: the conveyor belt may be arranged at a working height corresponding to the working height of a conveyor belt of a cooling tunnel using cooling air in the region of the bottom cooling unit. In other words, two different kinds of cooling tunnels achieve the same working height no matter which kind of medium is used in the bottom cooling unit. Consequently, there also is the advantage that the two kinds of cooling tunnels both include further common elements. For example, the supporting structures of the two kinds of cooling tunnels may have the same dimensions. Such an arrangement provides for advantages with respect to the manufacture of the cooling tunnel. The novel cooling tunnel may be rearranged to cool different articles of candy. It is possible to only rearrange the novel cooling tunnel in some of its sections. For example, a first section of the cooling tunnel may be operated with a cooling fluid to attain a great cooling effect in the region of the bottom cooling unit. A following section may be operated with cooling air to carefully cool the articles of candy in the region of the bottom cooling unit.

The dimensions of the novel cooling tunnel may be chosen in a way that the sum of the heights of the free space and of the cooling plate corresponds to the sum of the heights of a channel and of a carrier supporting sheet of a different cooling tunnel including a bottom cooling unit using cooling air. The free space has dimensions of a different cooling tunnel taking into account the height of the cooling plate. In case of cooling tunnels working with cooling air in the region of the bottom cooling unit, a belt supporting sheet is used. The belt supporting sheet supports the conveyor belt and the conveyor belt slides over the belt supporting sheet, respectively. A cooling channel over which cooling air is being guided is arranged below the

conveyor belt and below the belt supporting sheet, respectively. In case the novel cooling tunnel includes a bottom cooling unit working with a cooling fluid, there is the possibility of changing the arrangement or adapting the arrangement of the cooling tunnel in an easy way.

The cooling plate in the region of the section of treatment may be supported on distance elements or on stilts being distributed over the width of the free space and of the channel, respectively. These distance elements provide for the cooling plate being supported in a spaced apart, parallel, horizontal plane with respect to the ~~insolating~~ insulating plate without having a substantial negative effect on the accessibility of the free space. The cooling plate may be made of a comparatively thin sheet metal. It is possible to enter the free space with a flushing apparatus or a different apparatus for applying cleaning water into the free space to achieve a cleaning effect in the free space. Even in case of cooling tunnels of different kinds, there is the further advantage of the conveyor belts being located at the same working height and of the upper sides of the covers of the different cooling tunnels being located at the same height. Thus, the corresponding cross sections being located above and below the conveyor belt have approximately the same dimensions.

It is especially advantageous if the channel being located between the cooling plate and the ~~insolating~~ insulating plate is designed as a return conduit of the upper cooling unit. Since cooling air is used in the upper cooling unit, there is the possibility to design a great free cross section above the conveyor belt in a special way and to use it, for example, by the arrangement of adjustable flaps, absorption walls and the like. The entire cross section being located above the conveyor belt may be used. The channel being located between the plate and the ~~insolating~~ insulating plate may be used as return conduit. It is to be understood that the bottom cooling unit uses a cooling fluid being fed through the cooling plate.

In combination with the above-mentioned arrangement, it makes sense to design the channel being located between the cooling plate and the ~~insolating~~ insulating plate to be laterally open and to be surrounded by the cover. Due to the open design, the free space and the channel, respectively, may be freely accessed in a lateral direction after the cover has been removed or pivoted away in an upward direction. On the other hand, the free space being designed as a channel is sealed by ribs or protrusions being arranged in the region of the covers. Such an arrangement is absolutely sufficient to guide the air.

Other features and advantages of the present invention will become apparent to one with skill in the art upon examination of the following drawings and the detailed description. It is intended that all such additional features and advantages be included herein within the scope of the present invention, as defined by the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the present invention. In the drawings, like reference numerals designate corresponding parts throughout the several views.

Fig. 1 is a view of a vertical section through a first exemplary embodiment of a cooling tunnel in its working position.

Fig. 2 is a view of a vertical section through the cooling tunnel of Fig. 1 in its cleaning position.

Fig. 3 is a view of a detail X of Fig. 1 in an enlarged scale.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now in greater detail to the drawings, **Fig. 1** schematically illustrates a cooling tunnel 1 including a frame 2. The frame 2 is designed as a supporting structure or as a structure being similar to a table. A conveyor belt 4 is driven by a motor (not shown) to move through the cooling tunnel 1 in a moving direction perpendicular to the plane of illustration of Fig. 1. The conveyor belt 4 is located above a bottom 3. Articles of candy 6 are placed on the conveyor belt 4 to be cooled during the movement of the conveyor belt 4 through the cooling tunnel 1. The frame 2 includes support elements 7 and transverse bars 8. An ~~insolating~~ insulating plate 9 is supported on the frame 2. For example, the ~~insolating~~ insulating plate 9 may be made of polyurethane. The cooling tunnel 1 in its upper region is closed by a hood or a cover 10. The ~~insolating~~ insulating plate 9 and the cover 10 define a treating region 11 within the cooling tunnel 1. The cooling tunnel 1 is separated or divided in the moving direction 5 in a direction perpendicular to the plane of illustration of Fig. 1 to include a plurality of sections, segments or portions. The covers 10 have a length corresponding to a certain modular design of the cooling tunnel 1. Usually, the covers 10 are designed to be opened by a pivotal movement and/or they are designed to be removably supported on the edge portions of the ~~insolating~~ insulating plate 9. In this way, the treating region 11 of the cooling tunnel 1 may be easily accessed for cleaning purposes, maintenance purposes and inspection purposes. The cooling tunnel 1 includes a lower cooling unit or a bottom cooling unit 12 and an upper cooling unit 13. The bottom cooling unit 12 includes a cooling plate 14 through which a cooling liquid may stream or flow. The cooling plate 14 includes two sheets of metal. The edge portions of the sheets of metal are connected by welding. The two sheets are partially interconnected over their surfaces in a spaced apart manner in a way that the cooling liquid being located inside the cooling plate 14 is being

distributed and mixed. For example, a mixture of water and glycol or a different cooling fluid may be used as cooling liquid. The conveyor belt 4 with the articles of candy 6 being located thereon moves over the upper sheet of the cooling plate 14. The upper sheet of the cooling plate 14 has a substantially flat design. The articles of candy 6 are being cooled from below by the bottom cooling unit 12.

The cooling plate 14 and the ~~insolating~~ insulating plate 9 are arranged at a vertical distance. The cooling plate 14 may be supported on distance elements 15. The distance elements 15 are distributed over the surface, and they support the cooling plate 14. A free space 16 is formed between the ~~insolating~~ insulating plate 9, the cooling plate 14 and the corresponding cover 10. In case of the cover or hood 10 being lifted (**Fig. 2**), the free space 16 may be easily accessed for cleaning purposes, maintenance purposes and inspection purposes. However, the free space 16 may also be used as a return conduit for cooling air of the upper cooling unit 13. In this case, the cooling tunnel 1 may still be accessed for reasons of cleaning, maintaining and inspecting the cooling tunnel 1.

The design and arrangement of the free space 16 may be chosen in a way that the sum of the heights of the free space 16 and of the cooling plate 14 corresponds to the sum of the heights of a channel and of a sheet carrying the conveyor belt of a different cooling tunnel including a bottom cooling unit utilizing cooling air. It is to be understood that the second mentioned cooling tunnel is a cooling tunnel of a different kind. The arrangement of the first cooling tunnel provides a number of advantages. The working heights of the two cooling tunnels are identical. This means that the two conveyor belts 4 are located at the same height. In this way, tunnel modules of the first kind may be combined with tunnel modules of the second kind to together form a combined cooling tunnel. Additionally, changing tunnel sections within an existing

cooling tunnel is being simplified. It is especially easy for the user to clean the cooling tunnel. For the manufacturer of the cooling tunnel, the production of series is simplified. For example, all supports 7 for cooling tunnels of different kinds have the same height. The portion of the treating region 11 above the cooling plate 14 serves as upper cooling unit 13. This space may be separated by separating walls 17. It is also possible to arrange separating flaps to direct the cooling air directly onto the articles of candy 6 to cool the articles by convection or to remove the heat by radiation by absorption.

A roller path 18 is arranged below the ~~insolating~~ insulating plate 9 to transport the lower portion of the conveyor belt 4. It is to be understood that the tunnel modules may have a length in a range of approximately 2m or 3m. The cooling plates 14 have a continuous design. This means that each tunnel module only includes one cooling plate 14. However, each tunnel module includes a plurality of covers 10 to reduce the weight of each cover 10 and to simplify the pivotal movement of the covers 10. The covers 10 in their upwardly pivoted position (Fig. 2) are supported on supports [[18]] 19.

Fig. 3 illustrates the structure of the cooling plate 14 in greater detail. There is an upper sheet 20 on which the conveyor belt 4 is being guided. The lower sheet 21 of the cooling plate 14 may have a deformed design to have a cross section 22 having the design of a groove through which cooling fluid flows. The free space 16 is located below the lower sheet 21.

Many variations and modifications may be made to the preferred embodiments of the invention without departing substantially from the spirit and principles of the invention. All such modifications and variations are intended to be included herein within the scope of the present invention, as defined by the following claims.

ABSTRACT

A cooling tunnel (1) includes a driven conveyor belt (4) being designed and arranged to support articles of candy (6) and to convey them through the cooling tunnel (1) in a moving direction (5). A treating region (11) for articles of candy (6) is surrounded by an ~~insolating~~ insulating plate (9) and by a cover (10). An upper cooling unit (13) is arranged in a region above the conveyor belt (4). The upper cooling unit (13) includes a channel being designed and arranged for cooling air to flow therethrough. A bottom cooling unit (12) is arranged in a region below the conveyor belt (4). The bottom cooling unit (12) includes a cooling plate (14) being designed arranged for cooling liquid to flow therethrough. The cooling plate (14) in the treating region (11) is designed and arranged to be spaced apart from the ~~insolating~~ insulating plate (9) in a vertical direction. A free space (16) is formed between the cooling plate (14) and the ~~insolating~~ insulating plate (9).